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to the practical value of the book. Such topics as location and construction of school buildings, schoolhouse lighting, school desks, school baths, water supply, drinking fountains, toilet arrangements, ventilation, heating, schoolroom cleaning, janitor service, disinfectants, etc., have here the best treatment that they have received in any English text. In general, the book presents just those facts about school buildings which every person needs to know who has anything to do with their construction or care, and it is certain to become an indispensable handbook for school officers of every class.

It would be unfair to criticize the author for the brevity with which he treats the problems relating to the hygiene of growth, school medical inspection and the hygiene of instruction. The field of school hygiene has become too broad to permit adequate treatment of all the above-named divisions in a single volume. The division chosen for treatment in this book is one on which America had produced no first-class text in more than a decade, and the author has done his work well. The chapters on location and construction of school buildings, schoolhouse lighting, school desks, heating and janitor service are especially valuable.

Here and there the critical reader will find statements with which he may be inclined to disagree. Many will probably think the author's position on some of the problems of ventilation somewhat conservative, particularly in the scant consideration which is given to the experiments by Leonard Hill and others on the relative effects of humidity, temperature, movements and chemical composition of the air on physical efficiency. In all of these newer experiments the author declines to see anything revolutionary as regards the practical problems of ventilation, and the three main references cited on this chapter bear the dates 1893, 1896 and 1897, respectively.

Among the statements open to question are the following: "The results of careful examinations made in all progressive countries prove conclusively that the school conditions are responsible for a large part of the near-sightedness prevalent among children of the higher

school grades"; "myopia is not often, if ever, inherited," etc. (p. 221). Kotelmann is quoted approvingly to the effect that myopia is never found among primitive races. In regard to stuttering, the author states that "many, perhaps most, cases find an immediate cause in imitation" (p. 265). In speaking of the rapid progress made by Filipino school children in learning a foreign language the author states (p. 296) that it would be "utterly impossible to make the same progress with ignorant adults." That myopia is school-caused and never hereditary, that stuttering usually results from imitation, that children have greater learning capacity than adults are views which tradition has long sanctioned, but which recent investigations have thrown much doubt upon.

Certain other passages are, perhaps, open to question in the same way, and objection might be taken in a few cases to the author's selection of references. But to dwell on such minor points of criticism would be unfair, so carefully has the work in general been performed. The treatment is authoritative and comprehensive, yet the style is easy, stimulating and interesting. The book will long remain a standard treatise, especially on the construction and equipment of school buildings.

LEWIS M. TERMAN

The Geology of Soils and Substrata with Special Reference to Agriculture, Estates and Sanitation. By HORACE B. WOODWARD, F.R.S. London, Edward Arnold; New York, Longmans, Green & Co. 1913.

The intent of the writer of this work, as noted in his preface, is "to provide such information relating to the land surface as will be useful to students and teachers of agriculture, to those occupied in the management of estates and farms, or in sanitary engineering works." To do all this within a small octavo volume of but 366 pages is no small task and one that would be well-nigh if not quite impossible for any but a restricted area such as is comprised within the limits of Great Britain.

The author begins with a brief account of the aims and purposes of geology and the preparation of geological maps and soil surveys. He then passes to a discussion of the soils, their origin and fertility; the climatic conditions affecting them; their mineral and chemical composition and physical characteristics; drainage and irrigation; mineral fertilizers; forests and woodlands and the associated geological features; orchards, gardens and vineyards; geological considerations concerning estates; mineral rights; house sites with reference to drainage and water supply; closing with a series of eleven chapters on the geological formations of the various ages as occurring in England, with especial reference to the subjects previously treated. It is remarked that a map of the surface soil alone gives but a very imperfect idea of the capabilities of the land. Further, that no actual map showing the distribution in detail of the surface soils over any extended area has as yet been published, the so-called soil maps of the United States and Germany being in reality subsoil maps with indications of the nature and depth of the soil at particular spots. A good subsoil map, showing the variations in the strata, "whether drifts or the more regularly stratified formations, will always indicate the general distribution of the surface soils."

The most original portion of the book is that contained in the closing eleven chapters, in which all the principal geological formations of the kingdom are considered with reference to their soils, mineral resources, drainage and general availability for economic purposes. In this respect the work is quite unique, and, though local in its application, contains matter of value to the general reader. Illustrations are numerous, although, as is customary in works from the English press, line sketches preponderate over the half-tone reproductions from photographs, such as are so pronounced a feature of American works.

Mr. Woodward, it will be recalled, is also the author of the "History of the Geological Society of London," and "The Geology of Water Supply."

GEORGE P. MERRILL

NOTES ON METEOROLOGY AND CLIMATOLOGY

EUROPEAN METEOROLOGY

EUROPEAN meteorologists have recently given much attention to aeronautical, dynamical and mountain meteorology and to atmospheric electricity. In aeronautical meteorology greatest attention is being given to wind structure and to detailed forecasts for aviators. Research in dynamical meteorology is now particularly directed towards finding the laws governing the connection between upper-air processes and the weather at the earth's surface, with a view toward increased accuracy and range of weather forecasts.

An important institution for the study of dynamic meteorology is the set of synoptic charts of the atmospheric conditions over Europe, prepared under the direction of Professor V. Bjerknes, of Leipzig, from the monthly international aerological observations. Professor Bjerknes is the author of the still unfinished great work on "Dynamic Meteorology and Hydrography" which is being prepared under the auspices of the Carnegie Institution of Washington. The volumes on statics and kinematics have already appeared; and two more on dynamics and thermodynamics are yet to come.

In mountain meteorology, the föhn, local whirls and the difference in temperature between mountains and the free air at equal elevations have recently been studied.

Concerning atmospheric electricity, Mr. F. Schindelbauer in a thorough work entitled, "Über die Electricität der Niederschläge,"¹ has discussed the results of the registration of the electricity of precipitation at Potsdam, 1909 to 1911. The electricity of precipitation is thought to be from the splitting up of large drops (Lenard waterfall effect), from the influence of the charge of the air, or the result of friction with the electrified air (dirigible balloons are sometimes ignited from electricity thus generated). Dr. K. Kähler in an article entitled "Der Einfluss des Wetters auf die

¹ *Veröffentlichungen des Kön. Preussischen Met. Inst.*, 1913, No. 263.